

## SOME NOTES ON THE CORRECT IDENTITY OF OXALIS PES-CAPRAE, LINN. AND OXALIS PURPUREA, LINN. WITH SOME REMARKS ON THE LIMITATIONS OF A SPECIES IN THE GENUS OXALIS.

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I. For many years three of the commonest and best known species of South African *Oxalis* have been known by false names or names other than those first allotted to them.

The species in question are *O. cernua*, Thunb., now a troublesome weed in many parts of the world, *O. variabilis*, Jacq. and *O. purpurea*, Thunb. (sic) as understood by Sonder in Vol. I, p. 331 of the *Flora Capensis*, hereinafter referred to as *O. purpurea*, Sond. *O. cernua*, Th. and *O. variabilis*, Jacq. (a name erroneously attributed to Lindley by Sonder), were first described by Linnaeus in *Sp. Plantarum*, Ed. I. (1753) under the names *O. pes-caprae*, Linn. and *O. purpurea*, Linn. respectively, the latter being the species more fully described later by Thunberg (F. Cap. 535) as *O. purpurea*. *O. purpurea*, Sond. as exemplified by such specimens as E. and Z. 706, 707, 708, Zey 234, 2112 (ex parte), 2113 and 2115 (ex parte), bears no relationship to *O. purpurea*, Linn., and belongs to an entirely different group in the genus (see Section V).

### II. OXALIS PES-CAPRAE, Linn. (*O. cernua*, Thunb.).

This name was assigned by Linnaeus to the plant illustrated in *Burman Plantarum Africanorum*, 80, t. 29., a species with yellow flowers and although, owing to the ill-drawing of the leaves, there was ambiguity in Burman's description (*pentaphylla et hexaphylla*), Linnaeus states definitely that the leaves are ternate and bi-partite and the flowers yellow. The inflorescences in this figure<sup>1</sup> give an excellent representation of the species now known as *O. cernua*, Th.

The name *pes-caprae* has since been connected with and, although of an earlier date, treated as a synonym of the species *O. caprina*, Linn.

<sup>1</sup> Mr. S. Garside, M.Sc. informs me that in his opinion this figure has all the characters of a drawing by Claudius.

(vide Kew Index) owing to specimens which appear to be this plant<sup>2</sup> having been erroneously inserted in the Linnaean Herbarium (Sheet 13 in Jackson's list) under the name *pes-caprae* at a date long after the publication of the Spec. Plantarum. Linnaeus' description of *O. pes-caprae* and the figure he cites cannot possibly apply to this frail plant which has much smaller pale lilaceous flowers and which he himself named later as *O. caprina*, Linn. Syst. (1774). There is, however, an imperfect specimen of *O. cernua*, Th. on Sheet 14, Linn. Herb. under the name *O. pes-caprae* in an unknown hand, but this is also a late addition.

The type of *O. pes-caprae*, L. is therefore Burman's figure referred to above and there cannot be the least doubt that it is the well-known species later described by Thunberg as *O. cernua*.

Neither Jacquin or Sonder make any mention of the name *O. pes-caprae*, but Knuth in Pflanzenreich, Oxalidaceae (1930) has treated it as a synonym of *O. cernua*, Th.

The species, or group, is wide-spread in South Africa and it may be stated here that the form known as *O. sericea*, L.f. cannot at best be considered anything more than a variety. The typical forms admittedly appear to be different, but they are connected by numerous intermediates and there are many still more extreme forms which, taken in themselves, would be equally or more deserving of taxonomic separation.

### III. OXALIS PURPUREA, Linn. (*O. variabilis*, Jacq.).

Linnaeus, in Sp. Pl. I. p. 433, cites 3 figures of this species :—

Breyn. Centuria prima, 102, t. 46.

Commelin. Horti Medici I, 41, t. 21.

Burman. Plant. Africanorum, 67, t. 27, f. 3.

and the first two of these give unmistakable representations of the species now known as *O. variabilis*, Jacq. (Oxalis, pp. 89, 90, tables 52, 53). The third is very poorly drawn, but it is at least more like this species than *O. purpurea*, Sond.

Both Thunberg (Diss. Oxal. 1781) and Jacquin (Ox. p. 93, t. 56), as their descriptions show, correctly upheld Linnaeus' species, the latter attributing it to Linnaeus and citing the first two figures referred to above (Ox. p. 19), but it was not Thunberg's custom to quote the original author's name.

Sonder appears to have entirely overlooked the fact that the name *purpurea* was first used by Linnaeus and evidently did not realise that Thunberg and Jacquin were merely upholding Linnaeus' species, for he cites *O. purpurea*, Jacq. (which is really *O. purpurea*, L.) as a synonym

Some of these are possibly a form of *O. livida*, Jacq., but this cannot be certain in the absence of bulbs.

of *O. variabilis*, Jacq., correctly in so far that the two are identical. He has, however, by some inexplicable error, described and applied the name *purpurea* to plants belonging to an entirely different group in the genus (see Sect. V) and has referred to Thunberg as the author of the name. At the same time he cites *O. humilis*, Th. as his var.,  $\gamma$ , but the identity of this species will be dealt with in Sect. IV.

I am indebted to Mr. Carl G. Alm for kindly re-examining Thunberg's specimens of *O. purpurea*, at Uppsala, in comparison with recently collected specimens of the two groups sent to him by me. He informs me that these old specimens are in a bad state and not easy to recognise, but the following is a summary of his opinion on them. Distributed over 3 sheets labelled "*purpurea*" there are 7 specimens of *O. purpurea*, Linn. and 2 specimens of *O. purpurea*, Sond. Of the specimens labelled *O. variabilis* one appears to be *O. purpurea*, Linn. and 2 (named *O. variabilis*, var. *rubra*) are *O. purpurea*, Sond. This leads to the supposition that Thunberg did not, from his dried specimens, recognise the fundamental differences between the two groups.

Sonder may have been misled by the specimens named *O. purpurea* on Sheets 9 and 10 in the Linnaean Herbarium which were incorrectly so named much later by Linn. fil. and are not types. These specimens are the species described as *purpurea*, Th. by Sonder and not the real *purpurea* of the elder Linnaeus, whose detailed citations of figures leave no doubt what species he intended.

The common species now known as *O. variabilis*, Jacq. or incorrectly according to Sonder, *O. variabilis*, Lindl., must therefore re-assume its original name of *O. purpurea*, Linn.

It is probable that the plants depicted in the old figures were the reddish-purple flowered form figured by Jacquin (t. 53) which is very common in the south-western districts and this, I think, should be looked upon as the typical form. The name *purpurea*, L. must, however, in my opinion, be widely applied to a prolific group of plants with white, reddish, mauve, yellow or orange flowers, but all having the same essential characters in combination (see Sect. V).

To the recognised synonyms of this species (excluding *O. violacea*, Th.—actually *O. violacea*, L., an American species which has umbellate flowers—cited in Pflanz. Ox. 1930, p. 345), such species as *O. breviscapa*, Jacq., *O. stictophylla*, Sond., *O. decipiens*, Schltr., *O. laburnifolia*, Jacq., *O. sanguinea*, Jacq. and *O. humilis*, Th. will probably have to be added. These species are merely the few chance forms, out of an almost infinitely variable group, dried specimens of which have come under the scrutiny of European botanists who evidently could not even recognise their affinity, allotting them, as they did, to different sub-sections on the

evidence of comparatively unimportant characters. The group is actually composed of a chain of overlapping and interlocking forms which seems to defy classification as separate entities by any recognised taxonomic system.

IV. *Oxalis Eckloniana*, Presl. VAR *SONDERI*, Salter (*O. purpurea*, Sond.).

The plants collected by Zeyher<sup>3</sup>, referred to in Sect. I and falsely named *O. purpurea* in the *Flora Capensis* by Sonder, together with those specimens in Linnaeus' and Thunberg's Herbaria which are not the true *purpurea* of Linn., require a new name.

It would be convenient if the name *O. humilis*, Th. could be adopted, especially as the very imperfect single specimen of this plant in Thunberg's Herbarium is (so Mr. Alm informs me) apparently conspecific with *O. purpurea*, Sond., and thus with Zeyher's specimens. Unfortunately Thunberg's description of *O. humilis* (Fl. Cap. Th. p. 535) shows conclusively that he was describing a plant of the group *purpurea*, Linn. The words "bracteae duae oppositae, in medio scapi" and "tubus inflatus ampliatus" could not possibly be applied to *O. purpurea*, Sond., whereas they describe two of the most salient characters in the *purpurea*, Linn. group. (See Section V). This was recognised by Sprengel who cites *O. humilis*, Th. (evidently from the description) as a synonym of *O. purpurea*, Linn. (Syst. Veg. XIV Vol. II, p. 434).

Here then is a case where one plant is described and a specimen belonging to an entirely different group labelled with the same name in the herbarium of the author himself. The description is unmistakeable and must prevail.

Since there is no available synonym, it would appear at first sight, that all that is necessary is to apply some entirely new name to these plants, but in actual fact the matter is not so simple as it seems. As is the case with the true *O. purpurea*, L., they also belong to a similar intricate group, comprising the named forms *O. Eckloniana*, Presl., *O. approximata*, Sond., *O. bifolia*, Sond., *O. salmonicolor*, Schlechter and *O. Bolusii*, R. Knuth., which vary in the same way in the colour of the flowers and shape of the leaves. When all the intermediate forms are taken into account, these species can only, at the best, be treated as ill-defined varieties one of the other and I have perforce chosen the first-published name *O. Eckloniana*, Presl. (in which the typical form is

<sup>3</sup> Sonder's variety  $\gamma$  is represented by E. and Z. 724 (*O. nidulans*, E. and Z.) and E. and Z. 716 (*O. fallax* E. and Z.). The former is quite a separate species for which the name *O. nidulans*, E. and Z. must be revived and the latter is inseparable from the typical form. The name *fallax* had, however, been previously employed by Jacquin.



yellow-flowered) for the group. The name *O. Eckloniana*, Presl., var. *Sonderi* is therefore proposed for the form represented by Zeyher's plants.

V. DISTINCTIONS BETWEEN THE GROUPS ECKLONIANA, PRESL. AND *O. PURPUREA*, L. The group of plants which may be referred to as the Eckloniana group differs in the following essential characters from the true *purpurea* (*variabilis*) group. The styles and stamens are very slender and, when released from the corolla tube, spread as shown in Fig. 1.A and the anthers are sagittate. The tube of the corolla is almost cylindrical, the bracts, if present, are close to the calyx and the leaflets are without the characteristic pellucid dots (which turn black on drying) of the true *purpurea* group. The *purpurea* group can at once be distinguished by these dots or short streaks, by the more open corolla tube and by the bracts which are usually below the middle of the peduncle, while the styles and stamens are stouter and erect and the anthers oval as shown in Fig. 1.B.

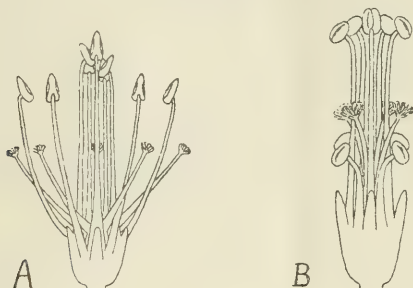


FIG. 1. Arrangement of styles and stamens in A. Eckloniana group (*O. purpurea*, Sond.) when released from the corolla tube and B. true *purpurea* group (*O. variabilis*, Jacq.), enlarged. Note:—In the long-styled form of A the styles are erect and both sets of stamens are spreading.

#### VI. THE COMPLEXITY OF CERTAIN GROUPS.

Nine seasons of collecting and observation in the south western Cape, during which I have covered at least 40,000 miles in the *Oxalis* season and had under cultivation 650 different sets of bulbs, has convinced me that in certain groups, though not by any means all, the numerous different forms vary and overlap so inextricably that any attempt to classify them must be abortive. Again, all collectors of *Oxalis* in South Africa, including myself, have only explored a small fraction of the huge and often somewhat inaccessible areas where this genus abounds, areas in

which, during the main *Oxalis* season (mid-winter), there is little else to attract a botanist. The genus is prolific both in quantity and variety and one may therefore speculate on the variants still to be discovered.

*Oxalis* are usually found in local colonies and in these colonies, large or small, the plants, though more than one species may be present, are all of one pure strain. I once observed, within a few miles of Cape Town, no less than ten entirely different species growing on a plot of ground no larger than a tennis court. Beyond a few crosses between colour forms, I have only once suspected hybridisation and that between *O. pes-caprea*, L. and *O. sericea*, L.f. which are so nearly related that I take them to be the same species. It therefore seems unlikely that the extraordinary number of local variations can be accounted for by hybridisation in the past.

Should herbarium botanists find difficulty in the determination, from keys and descriptions, of dried specimens of *Oxalis* which come into their hands, it may be some satisfaction to them to learn something of the complexity and difficulties presented by the genus in the field and to know that in some groups at least, they may be attempting what is practically impossible.

In the foregoing notes I have omitted all reference to authors whose works do not affect the main issue, consisting as they generally do of mere compilations. While I hope to have still further opportunities of making observations in the field, I have also purposely refrained for the present from attempting to give a complete and definite synonymy for the three species or groups dealt with here.

I am very much indebted to the following botanists for the assistance they have given me. To S. Garside, Esq., M.Sc. for his opinion on the history of the specimens in the Linnaean Herbarium and to A. W. Exell, Esq., M.A. for information as regards their actual identity: also to Mr. C. G. Alm and Dr. Harry Smith for comparing my specimens with those in Thunberg's Herbarium at the Botaniska Institutionen at Uppsala.